

Endevco[®] sensors for flight test

As the leading sensor provider for development and flight test of aircraft and spacecraft, Endevco's advanced measurement devices are proven to withstand the challenges of extreme environments. Our accelerometers, pressure sensors and electronics are trusted solutions found in hundreds of flight tests worldwide and have provided the industry performance and reliability for several decades.

- › Cryogenic temperatures (-452°F, -269°C)
- › Pressures from 1 to 20,000 psi
- › Vibration conditions from DC response to 200,000 g shock

Applications

- › Flutter testing of airframes
- › Engine testing
- › Vehicle dynamics studies
- › Turbulent airflow measurements
- › Vibroacoustic testing
- › Missile and rocket launches



Endevco® sensors



Model number	7290GM5	8515C	8510B
Description	DC accelerometer Watertight to IP67 Temperature compensated	Pressure sensor 0.03 inch thin Surface mount	Acoustic pressure sensor Vent tube Temp compensation
Linear range g	±2 / ±5 / ±10 / ±30 / ±50 / ±100 / ±200	0-15/0-50 psia	2 / 5 / 200 / 500 / 2000 psig (100 to 190 dB SPL)
Sensitivity mV/g typical	1000 / 400 / 200 / 66 / 40 / 20 / 10	13.3 / 4.0	100 / 60 / 1.5 / 0.6 / 0.15 mV/psi (-93dB ref 1V per Pa)
Frequency response ±5%	0-15 / 0-30 / 0-500 / 0-1000 / 0-2000 / 0-2000 / 0-2000	N/A	70 / 85 / 320 / 500 / 900 kHz (±0.5dB to 5,000Hz; ±5dB to 20,000Hz)
Non linearity % FSO typical	0.2 / 1.0 (100g)	0.2	1.0 / .5 / 0.25 / 0.25 / 0.25 (1.0)
Shock limit g	5000 (2g / 5g / 10g) / 10,000	10,000	20,000
Operating temperature °C (°F)	-55 to +121 (-67 to +250)	-54 to +121 (-65 to +250)	-54 to +121 (-65 to +250)
Dimensions mm (in)	25.4 x 21.6 x 7.6 (1.00 x 0.85 x 0.30)	6.35 (0.25) dia	3.86 (0.152) dia
Weight grams	10	0.08	2.3
Excitation voltage Vdc	8 to 40	10	10
Mounting method	Screw 4-40	Adhesive	10-32 UNF-2A



Endevco variable capacitance accelerometers provide accurate low frequency measurements over temperature for flutter testing and their DC response enables measurement of control surface motion. Our piezoresistive pressure sensors feature quick response times and high output for excellent signal to noise ratio, with designs suitable for airflow measurements or high intensity sound. We control the quality of the sensing elements, which are produced in our own US based MEMS facility.

Reliable performance in extreme environments



Model number	2220E	7722 / 7724	65HT	2510
Description	PE accelerometer 360° cable orientation Lightweight	Cryogenic accelerometer	Triaxial Isotron accelerometer High temperature	High intensity microphone High temperature Vibration compensated
Sensitivity	3.0 pC/g	3.7 pC/g	10 mV/g	31 pC rms@140 dB SPL
Sinusoidal limit g	1000	500	10,000 / 5000 / 5000	150
Shock limit g	5000	2500	15,000 / 10,000 / 10,000	1000
Frequency response ±1 dB Hz	1 to 12,000	1-6000	3-8000	2-4000
Operating temperature °C (°F)	-55 to +260 (-67 to +500)	-269 to +177 (-452 to +350)	-55 to +175 (-67 to +347)	-55 to +260 (-67 to +500)
Signal/ground isolation	Yes	7722 - No / 7724 - Yes	No	Yes
Hermetic seal	Yes	Yes	Yes	Yes
Weight gram	0.5	29	5	.57
Dimensions mm (in)	9.53 x 5.8 [0.375 x 0.23]	16.0 hex x 23.1 (5/8 hex x 0.91)	10 cube (0.39 cube)	38.1 x 38.9 x 28.6 (1.5 x 1.5 x 1.1)
Mounting method	Screw	Stud	Stud	Screw
Cable included	3053V-120	3090C-120	3027AVM13-84 3027AM3-36	3090C-120



Our piezoelectric accelerometers are used in extreme temperature environments where most electronics cannot survive. Isotron accelerometers are used in more benign temperatures, up to +175°C. These accelerometers are offered in a variety of configurations to facilitate the optimal installation at the measurement point. When measuring the acoustic signatures of missile and rockets, Endevco high-intensity microphones are the sensor of choice.

Portable system verification instruments



Model number	4830B
Description	Handheld accelerometer simulator
Outputs	Single-ended charge Differential charge Single-ended voltage Tachometer Isotron (IEPE)
Frequency range Hz	1-20,000, resolution 0.5
Amplitude	Adjustable up to 10,000 pC or mV pk
Amplitude accuracy	±1%
Broadband noise	< 2 mV or 2 pc
Battery	Rechargeable battery
Features	<ul style="list-style-type: none"> • FFT input function • User defined simulation profiles • Utility software for profile setup



Model number	ReferenceMate REF2520R
Description	Multiple frequency Handheld shaker
Operating frequency Hz	61.4 / 100.0 / 159.2
Acceleration output g	1.00
Distortion	≤ 3%
Load grams	0-250
Power	Internal 4 AA batteries Accepts external DC power supply
Dimensions	2.10" (5.33 cm) Dia. x 9.25" (23.50 cm) H
Mounting thread	1/4-28 female
Features	<ul style="list-style-type: none"> • User selectable frequency setting • Ruggedized, protective boot • Overload indicator • Reference test points

Before beginning an expensive flight test and taking critical data, it is important to confirm your setup is operational and properly configured. Endevco offers multiple products to address the challenges of complete system verification. These products give confidence that the sensor, cabling, signal conditioning, and DAQ system are all working as intended.

Single channel in line signal conditioners



Model number	2680MX	2685MX	2777A
Input	PE	Isotron	DIFF PE
Channels	1	1	1
Gain	0.1-100 mV/pC	0.1-100 mV/mV	2 / 10 mV/pC
Broadband noise rms	1.5 mV	1.5 mV	1/5 mV (RTO)
Lower cutoff freq Hz [-3 dB]	3	0.7	5.73 / 8.59 / 11.5 / 14.3 / 113
Upper cutoff freq Hz [-3 dB]	Selectable	Selectable	17,500
Power requirements VDC	20-32	20-32	22-31
Operating temperature °F [°C]	-67 to +212 [-55 to 100]	-67 to +212 [-55 to 100]	-5 to +185[-15 to 85]
Weight g	34	34	227

Data accuracy depends as much on the signal conditioning as it does on sensors. Endevco designs its own supporting electronics to ensure overall data quality and reliability. For flight test applications, Endevco brand piezoelectric and Isotron signal conditioners feature a small, lightweight package and allow for a wide variety of configurations to meet the demands of any application.



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